Amendments to the Claims

1. (twice amended) A shut-off valve assembly comprising:

a hollow valve body having a first opening and a second opening;

a valve seat positioned within the hollow valve body proximate to the first opening;

a first diaphragm assembly, wherein a deflectable portion of the first diaphragm assembly is attached to an interior surface of the hollow valve body forming a first volume between the valve seat and the first diaphragm assembly;

wherein the first diaphragm assembly comprises a sleeve portion, and the sleeve portion comprises an open end and a length;

a second diaphragm attached to another portion of the interior of the hollow valve body and attached to the first diaphragm assembly such that a second volume is defined between the second diaphragm and the second opening, wherein a third volume is formed between the first diaphragm assembly and the second diaphragm, the third volume sealed from the first volume and the second volume by the first diaphragm assembly and the second diaphragm;

at least one flow hole formed in the first diaphragm assembly, wherein the at least <u>one</u> flow [[one]] hole allows a process flow to flow between the first volume and the second volume; and

a self-aligning head assembly comprising;

a stem attached at a first end to another portion of the first diaphragm assembly;[[and]]

<u>wherein the stem allows the process flow to flow through the open end of the sleeve portion, through the length of the sleeve portion, and out through the flow hole; and</u>

a valve head coupled to a second end of the stem[[,]];

wherein a deflection of the deflectable portion of the first diaphragm assembly and the second diaphragm allows the other portion of first diaphragm assembly to move in order to open and close the valve head from the valve seat.

2. (original) The assembly of Claim 1 wherein the valve head comprises a floating valve head held in position between the second end of the stem and the valve seat by the second end of the stem.

3. (original) The assembly of Claim 1 wherein the valve head is attached to the second end of the stem, the stem comprising

a flexible stem.

4. (original)The assembly of Claim 1 wherein the valve head comprises a poppet wherein at least a portion of the poppet is spherical.

5 (previously cancelled)

6. (original) The assembly of Claim 1 wherein the process flow generally flows in-line through the hollow valve body between the first opening and the second opening via the first volume and the second volume.

7. (original) The assembly of Claim 1 further comprising an actuator assembly coupled to the first diaphragm assembly and the second diaphragm for causing the deflection of the deflectable portion of the first diaphragm assembly and the second diaphragm.

8. (original) The assembly of Claim 7 wherein the actuator assembly is a type selected from a group consisting of a mechanical actuator assembly, an electromagnetic actuator assembly, a piezoelectric actuator assembly, a pneumatic actuator assembly and a hydraulic actuator assembly.

9. (original) The assembly of Claim 7 wherein the actuator assembly is substantially contained within an external

a flexible stem.

4. (original)The assembly of Claim 1 wherein the valve head comprises a poppet wherein at least a portion of the poppet is spherical.

5 (previously cancelled)

6. (original) The assembly of Claim 1 wherein the process flow generally flows in-line through the hollow valve body between the first opening and the second opening via the first volume and the second volume.

7. (original) The assembly of Claim 1 further comprising an actuator assembly coupled to the first diaphragm assembly and the second diaphragm for causing the deflection of the deflectable portion of the first diaphragm assembly and the second diaphragm.

8. (original) The assembly of Claim 7 wherein the actuator assembly is a type selected from a group consisting of a mechanical actuator assembly, an electromagnetic actuator assembly, a piezoelectric actuator assembly, a pneumatic actuator assembly and a hydraulic actuator assembly.

9. (original) The assembly of Claim 7 wherein the actuator assembly is substantially contained within an external

footprint of the hollow valve body.

10. (original) The assembly of Claim 7 wherein the actuator assembly provides an actuating force axial to the movement of the process flow through the hollow valve body.

11. (original) The assembly of Claim 7 wherein the actuator assembly variably deflects the deflectable portion of the first diaphragm assembly and the second diaphragm which moves the other portion of the first diaphragm assembly a variable distance, such that the position of the valve head relative to the valve seat is variably selectable, wherein giving the shut-off valve assembly capabilities of a proportional valve assembly.

12. (original) The assembly of Claim 7 wherein the deflectable portion comprises a ring portion and the other portion of the first diaphragm assembly comprises a sleeve portion.

13. (original) The assembly of Claim 12 wherein the actuator assembly further comprises a washer positioned within the third volume and surrounding the sleeve portion, wherein the washer contacts the second diaphragm.

14. (original) The assembly of Claim 13 wherein the actuator assembly further comprises a spring within the third volume located between the second diaphragm and a first side of the

washer, wherein the spring contacts the second diaphragm and the first side of the washer and exerts pressure against the first side of the washer, wherein the first diaphragm assembly is held such that the valve head is sealed into the valve seat.

15. (original) The assembly of Claim 14 wherein the actuator assembly further comprises an actuator member coupled to an actuator, wherein upon operation of the actuator, the actuator member applies a force against a second side of the washer, causing the washer to deflect the second diaphragm and the ring portion of the first diaphragm assembly in an opposite direction as held by the spring, wherein the valve head is caused to unseal from the valve seat.

16. (original) The assembly of Claim 15 wherein the actuator member comprises a ball held between the actuator and the washer.

17. (original) The assembly of Claim 15 wherein the actuator comprises a ring having a detent, wherein the actuator member sits within the detent, wherein upon rotation of the actuator, the actuator member is forced out of the detent such that the actuator member applies pressure against the second side of the washer.

18. (original) The assembly of Claim 1 wherein the valve head seals into the valve seat at the leak rate at temperatures up to 1000 degrees centigrade.

19. (original) The assembly of Claim 1 wherein the surface area of the deflectable portion of the first diaphragm assembly facing the first volume is approximately equal to the surface area of the second diaphragm facing the second volume, such that a first force exerted on the deflectable portion by the process flow in the first volume substantially cancels the force in the opposite direction exerted on the second diaphragm by the process flow in the second volume, wherein the first diaphragm assembly and the second diaphragm are substantially balanced with respect to the pressure of the process flow.

20. (twice amended) A valve assembly comprising:

a hollow valve body having a first opening and a second opening;

a valve seat positioned within the hollow valve body;

a first diaphragm assembly having a ring portion and a sleeve portion, wherein a perimeter of the ring portion is attached to an interior surface of the hollow valve body such that a first volume is defined between the valve seat and the first diaphragm assembly;

<u>wherein the first diaphragm assembly comprises a sleeve</u>

portion, the sleeve portion comprises an open end and a length;

a second diaphragm attached at a perimeter surface to the another portion of the interior of the hollow valve body and attached to the sleeve portion such that a second volume is defined between the second diaphragm and the second opening, wherein a third volume is formed between the first diaphragm assembly and the second diaphragm, the third volume sealed from the first volume and the second volume by the first diaphragm assembly and the second diaphragm;

at least one flow hole formed in the sleeve portion, wherein the at least one flow hole allows a process flow to flow between the first volume and the second volume;

a self-aligning head assembly comprising:

a stem coupled at one end to the first diaphragm assembly; [[and]]

wherein the stem allows the process flow to flow through the open end of the sleeve portion, through the length of the sleeve portion, and out through the flow hole; and

a valve head coupled to another end of the stem, wherein the valve head is adapted to self-align into the valve seat; and

an actuator assembly coupled to the first diaphragm

assembly and the second diaphragm for deflecting the ring portion of the first diaphragm assembly and the second diaphragm which moves the sleeve portion and which controls the position of the valve head relative to the valve seat.

21. (original) The assembly of Claim 20 wherein the actuator assembly deflects the first diaphragm and the second diaphragm to open and close the valve head from the valve seat, wherein creating a shut-off valve assembly.

22. (original) The assembly of Claim 21 wherein the valve head is adapted to seal into the valve seat with a leak rate of less than or equal to 4×10^{-9} atmosphere cc of Helium/sec.

23. (previously amended) The assembly of Claim 22 wherein the valve head is adapted to seal into the valve seat with the leak rate at temperatures up to 1000 degrees centigrade.

24. (original) The assembly of Claim 20 wherein the actuator assembly variably deflects the ring portion of the first diaphragm assembly and the second diaphragm which moves the sleeve portion a variable distance, such that the position of the valve head relative to the valve seat is variably selectable, wherein creating a proportional valve assembly.

25. (original) The assembly of Claim 24 wherein, in one

position, the actuator assembly causes the valve head to seal into the valve seat with a leak rate of less than or equal to 4 X 10^{-9} atmosphere cc of Helium/sec.

26. (original) The assembly of Claim 20 wherein the valve head comprises a floating valve head held in position between the second end of the stem and the valve seat by the second end of the stem.

27. (original) The assembly of Claim 20 wherein the valve head is attached to the second end of the stem, the stem comprising a flexible stem.

28. (original) The assembly of Claim 20 wherein at least a portion of the valve head is spherical.

29. (previously cancelled)

30. (original) The assembly of Claim 20 wherein the process flow generally flows in-line through the hollow valve body between the first opening and the second opening via the first volume and the second volume.

31. (original) The assembly of Claim 20 wherein the actuator assembly is a type selected from a group consisting of a mechanical actuator assembly, an electromagnetic actuator

assembly, a piezoelectric actuator assembly, a pneumatic actuator assembly and a hydraulic actuator assembly.

32. (original) The assembly of Claim 20 wherein the actuator assembly is substantially contained within an external footprint of the hollow valve body.

33. (original) The assembly of Claim 20 wherein the actuator assembly provides an actuating force axial to the movement of the process flow through the hollow valve body.

34. (original) The assembly of Claim 20 wherein the surface area of the ring portion of the first diaphragm assembly facing the first volume is approximately equal to the surface area of the second diaphragm facing the second volume, such that a first force exerted on the ring portion by the process flow in the first volume substantially cancels the force in the opposite direction exerted on the second diaphragm by the process flow in the second volume, wherein the first diaphragm assembly and the second diaphragm are substantially balanced with respect to the pressure of the process flow.

35. (twice amended) A valve assembly comprising:

a hollow valve body having a first opening at one end of the hollow valve body and a second opening at an opposite end of

the hollow valve body;

a valve seat positioned within the hollow valve body;

a first diaphragm assembly having a ring portion and a sleeve portion, wherein a perimeter of the ring portion is attached to an interior surface of the hollow valve body such that a first volume is defined between the valve seat and the first diaphragm assembly;

wherein the first diaphragm assembly comprises a sleeve portion, the sleeve portion comprises an open end, and a length;

a second diaphragm attached to the another portion of the interior of the hollow valve body and attached to the sleeve portion of the first diaphragm assembly such that a second volume is defined between the second diaphragm and the second opening, wherein a third volume is formed between the first diaphragm assembly and the second diaphragm, the third volume sealed from the first volume and the second volume by the first diaphragm assembly and the second diaphragm;

at least one flow hole formed in the sleeve portion, wherein the at least one flow hole allows a process flow to flow between the first volume and the second volume; and

a valve head coupled to the sleeve portion, wherein the valve head is adapted to seal into the valve seat; and

a stem coupled at one end to the first diaphragm assembly;

wherein the stem allows the process flow to flow through the open end of the sleeve portion, through the length of the sleeve portion, and out through the flow hole;

an actuator assembly coupled to the first diaphragm assembly and the second diaphragm for deflecting the ring portion of the first diaphragm assembly and the second diaphragm which moves the sleeve portion and which controls the position of the valve head relative to the valve seat;

wherein a surface area of the ring portion facing the first volume is approximately equal to a surface area of the second diaphragm facing the second volume, such that a first force exerted on the ring portion by the process flow in the first volume substantially cancels a second force in the opposite direction exerted on the second diaphragm by the process flow in the second volume, wherein the first diaphragm assembly and the second diaphragm are substantially balanced with respect to the pressure of the process flow.

36. (original) The assembly of Claim 35 wherein an actuation force required to deflect the ring portion and the sleeve

portion is greater than a differential force on the ring portion and the second diaphragm, wherein the differential force is defined as the difference between the first force and the second force.

37. (original) The assembly of Claim 35 wherein an actuation force required to deflect the ring portion and the sleeve portion is less than the first force.

38. (original) The assembly of Claim 35 wherein an actuation force required to deflect the ring portion and the sleeve portion is less than the second force.

39. (original) The assembly of Claim 35 wherein a surface area of the ring portion facing the third volume is approximately equal to a surface area of the second diaphragm facing the third volume, such that a third force exerted on the ring portion by atmospheric pressure in the third volume substantially cancels a fourth force in the opposite direction exerted on the second diaphragm by the atmospheric pressure in the third volume, wherein the first diaphragm assembly and the second diaphragm are substantially balanced with respect to the atmospheric pressure within the third volume.

40. (original) The assembly of Claim 35 wherein, the actuator assembly is a type selected from a group consisting of a

mechanical actuator assembly, an electromagnetic actuator assembly, a piezoelectric actuator assembly, a pneumatic actuator assembly and a hydraulic actuator assembly.

41. (original) The assembly of Claim 35 wherein the actuator assembly is substantially contained within an external footprint of the hollow valve body.

42. (original) The assembly of Claim 35 wherein the actuator assembly provides an actuating force axial to the movement of the process flow through the hollow valve body.

43. (original) The assembly of Claim 35 wherein the actuator assembly deflects the first diaphragm and the second diaphragm to open and close the valve head from the valve seat wherein creating a shut-off valve assembly.

44. (original) The assembly of Claim 43 wherein the valve head is adapted to seal into the valve seat with a leak rate of less than or equal to 4×10^{-9} atmosphere cc of Helium/sec.

45. (original) The assembly of Claim 35 wherein the actuator assembly variably deflects the ring portion of the first diaphragm assembly and the second diaphragm which moves the sleeve portion a variable distance, such that the position of the valve head relative to the valve seat is variably selectable, wherein

creating a proportional valve assembly.

46. (original) The assembly of Claim 35 wherein the valve head comprises a floating valve head held in position relative to the valve seat by one end of a stem, the other end of the stem is attached to the sleeve portion.

47. (original) The assembly of Claim 35 wherein the valve head is attached to one end of a flexible stem, the other end of the flexible stem is attached to the sleeve portion.

49. (original) The assembly of Claim 35 wherein the process flow generally flows in-line through the hollow valve body between the first opening and the second opening via the first volume and the second volume.

50 (previously presented) The assembly of claim 1 wherein the valve head is adapted to self-align into the valve seat with a leak rate of less than or equal to 4×10^{-9} atmosphere cc of Helium/sec.